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# Optimal Recruiter Allocation Model (ORAM)



By
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September 1981





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Program Analysis and Evaluation Directorate
Fort Sheridan, Illinois 60037

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by

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## ABSTRACT

This paper summarized USAREC's application of the non-linear model which distributes USAREC's production recruiting force for maximum enlistment of high-quality high school degree graduates. USAREC's recent improvements include the use of Gauss-Marquardt regressions, an advertising variable and an accurate measure of district attitudes toward military service.

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# Optimal Recruiter Allocation Model (ORAM)

## I. Introduction

A major problem confronting the United States Army Recruiting Command (USAREC) is how to determine the best distribution of scarce resources, that is, recruiters and advertising dollars. In 1976 General Research Corporation (GRC) developed the Optimal Recruiter Allocation Model (ORAM) to help the Army solve this problem. ORAM, a non-linear optimization procedure, provides optimal recruiter distribution solutions for different recruitment strategies. The purpose of this paper is to describe the ORAM modeling procedure and USAREC improvements of the model since 1976. The first section gives an overview of the modeling process, the second describes the procedure for the estimation of the model parameters and the third describes the non-linear optimization techniques. A detailed mathematical discussion is avoided but the interested reader is referred to the GRC final reports (references 2 and 3).

USAREC has elements located in all 50 states, the District of Columbia, Europe, Panama, the Philipines, Guam, American Samoa, Saipan and Korea. The organization is shown in table 1.

Table 1. USAREC organization.

| ELEMENT | COMMANDER |
|---|---|
| HQ USAREC | MAJOR GENERAL |
| REGIONS | COLONEL |
| DISTRICTS (DRC) | LIEUTENANT COLONEL |
| AREAS (ARC) | CAPTAIN |
| STATIONS (RS) | E7-E5 |

## II. Overview of the Modeling Procedure

The use of ORAM involves two distinct phases. First, the user must estimate the parameters of the variables which impact on the recruitment of the prime market: mental category (MC) I-IIIA HSG males. This prime market is considered to be the more intelligent, more socially adjusted segment of the 17-21-year-old US population. In this analysis, the prime market is considered to be "supply" constrained while all other markets, representing the lower mental categories and/or non-high school graduates, are considered to be "demand" constrained.

Next the parameter values are used in a non-linear optimization program which is the heart of the ORAM procedure. A Fibonacci/Newton algorithm minimizes a recruiter cost objective function which is constrained to achieve a desired level of prime market accessions. The output is delivered in several formats which will be described in later sections.

## III. Cross-Sectional Model

### a. Introduction

As stated above, the first step in the ORAM procedure is to estimate the parameters of the variables which determine the enlistment projections of the prime market. This projection is expressed in the Cobb-Douglas function shown below:

$$Y = e^{a_o} x_1^{a_1} x_2^{a_2} \ldots x_n^{a_n} \quad (1)$$

where Y is the dependent variable (prime market accessions) and $X_1 \ldots X_n$ are the independent variables selected to predict the number of prime market accessions. More specifically, the supply equation is expressed as

$$A_i = e^{a_o} Q_i^{a_1} R_i^{a_2} A_i^{a_3} P_i^{a_4} W_i^{a_5} U_i^{a_6} \quad (2)$$

where the following notation applies

$A_i$ = Prime market accessions in district recruiting command ($DRC_i$).

$Q_i$ = Qualified military available (QMA) in $DRC_i$ that are HSG and MC I-III.

$R_i$ = On-production recruiters in $DRC_i$.

$A_i$ = Total media advertising expenditures in $DRC_i$.

$P_i$ = Positive propensity to enlist in the Army in $DRC_i$.

$W_i$ = Reciprocal of the civilian wage in $DRC_i$.

$U_i$ = Unemployment rate in $DRC_i$.

$a_o$ = Constant parameter.

$a_1$ = QMA parameter.

$a_2$ = Recruiter parameter.

$a_3$ = Advertising parameter.

$a_4$ = Propensity parameter.

$a_5$ = Wage parameter.

$a_6$ = Unemployment parameter.

The equation is solved by ordinary least squares regression using the logarithmic transformation

$$\text{Ln } A_i = a_o + a_1 \cdot \ln Q_1 + a_2 \cdot \ln R_i + a_3 \cdot \ln A_i + a_4 \cdot \ln P_i + a_5 \cdot \ln W_i + a_6 \cdot \ln U_i \quad (4)$$

with the solution to parameters $a_1$ to $a_6$ representing variable elasticities.

b. Discussion of Input Variables

1. Qualified Military Available (QMA). This variable is an estimate of the 17-21-year-old prime market males that are qualified to enlist in the military. The estimate is adjusted for institutionalized males and those physically or mentally unqualified for military service.

2. Recruiters. This variable represents the number of full-time on-production recruiters assigned to the DRC.

3. Media Advertising Expenditures. A necessary first step in determining the true effect of advertising on enlistment supply is the acquisition of accurate expenditure data. Therefore, USAREC required N. W. Ayer, our advertising agency, to produce monthly ADI expenditure reports by media type (national TV, spot TV, direct mail, magazines, etc.) from fiscal year (FY) 78 forward. The data was converted to district recruiting command format by a USAREC algorithm. For the first time this effort produced an accurate record of DRC media advertising expenditures. See table 2.

4. Propensity for Service in the Army. An accurate measure of the DRC variation in propensity for military service is a required variable in the model. To obtain these measurements, USAREC employed the results of the DOD sponsored, semi-annual Youth Attitude Tracking Survey (YATS) conducted since the fall of 1975 by Market Facts, Inc. Each YATS sampled approximately 5200 males from ages 17-21. The residence of each respondent was coded by their state and county locations. USAREC correlated these codes to counties within DRC's. Using the summed results of 10 survey periods, it was possible to produce a statistically significant sample in each DRC. Respondents who answered "definitely yes" or "probably yes" to the question of the possibility that they would be serving in the US Army in the next few years were included in the positive propensity count. The results were dramatic and propensities ranged from a low of 6.20 percent in the Portland DRC to a high of 23.32 percent in the Columbia, S.C. DRC. These DRC propensity estimates are the most accurate used in any USAREC analysis to date. See table 3.

5. Reciprocal of the Civilian Wage. To account for the economic attractiveness of military service relative to civilian occupations, the reciprocal of civilian pay was included in the model. The data was taken from Table C-13, State and Area Hours and Earnings, "Employment and Earnings, January 1981", published by the US Department of Labor. The traditional treatment of this variable is to include it as a ratio of the military to civilian wage, but here it is simply used as the reciprocal of the civilian wage.

Table 2. FY 80 National Media Advertising Expenditures ($000)

| USAREC DRC | | EXP($) | USAREC DRC | | EXP($) |
|---|---|---|---|---|---|
| Albany, NY | 1A | 213 | Jackson, MS | 4E | 363 |
| Baltimore, MD | 1B | 770 | Kansas City, MO | 4F | 442 |
| Boston, MA | 1C | 705 | Little Rock, AR | 4G | 312 |
| Concord, NH | 1D | 184 | New Orleans, LA | 4H | 304 |
| Harrisburg, PA | 1E | 449 | Oklahoma City, OK | 4I | 218 |
| New Haven, CT | 1F | 554 | San Antonio, TX | 4K | 391 |
| Long Island, NY | 1G | 987 | Chicago, IL | 5A | 776 |
| Newburgh, NY | 1H | 750 | Cincinnati, OH | 5B | 274 |
| Ft Monmouth, NJ | 1I | 557 | Cleveland, OH | 5C | 601 |
| Niagara Falls, NY | 1J | 265 | Columbus, OH | 5D | 263 |
| Philadelphia, PA | 1K | 853 | Des Moines, IA | 5E | 226 |
| Pittsburgh, PA | 1L | 578 | Detroit, MI | 5F | 660 |
| Syracuse, NY | 1M | 170 | Indianapolis, IN | 5H | 316 |
| Atlanta, GA | 3A | 453 | Lansing, MI | 5I | 442 |
| Beckley, WV | 3B | 123 | Milwaukee, WI | 5J | 439 |
| Charlotte, NC | 3C | 263 | Minneapolis, MN | 5K | 445 |
| Columbia, SC | 3D | 316 | Omaha, NB | 5L | 336 |
| Jacksonville, FL | 3E | 577 | Peoria, IL | 5M | 393 |
| Louisville, KY | 3F | 248 | St Louis, MO | 5N | 528 |
| Miami, FL | 3G | 437 | San Francisco, CA | 6A | 767 |
| Montgomery, AL | 3H | 399 | Honolulu, HI | 6E | 16 |
| Nashville, TN | 3I | 378 | Los Angeles, CA | 6F | 1140 |
| Raleigh, NC | 3J | 231 | Phoenix, AZ | 6G | 351 |
| Richmond, VA | 3K | 389 | Portland, OR | 6H | 309 |
| San Juan, PR | 3L | 245 | Sacramento, CA | 6I | 469 |
| Albuquerque, NM | 4A | 214 | Salt Lake City, UT | 6J | 226 |
| Dallas, TX | 4B | 581 | Santa Ana, CA | 6K | 779 |
| Denver, CO | 4C | 351 | Seattle, WA | 6L | 339 |
| Houston, TX | 4D | 551 | | | |

Command Total $24,976

6. Unemployment levels. The aggregate unemployment level was included in the model to account for the effect of unemployment. The data was taken from Table E-1, State and Area Unemployment, "Employment and Earnings, January 1981", published by the US Department of Labor.

c. Data Set

One of USAREC's primary objectives was to determine the effects of advertising on the prime market. Since our advertising data was in an

Table 3. DRC propensities developed from the Youth Attitude Tracking Surveys, Fall 75 - Spring 80.

NE RRC*

| DRC | PROP(%) |
|---|---|
| Albany | 12.59 |
| Baltimore | 12.67 |
| Boston | 10.53 |
| Concord | 16.86 |
| Harrisburg | 11.45 |
| New Haven | 10.23 |
| Long Island | 6.36 |
| Newburgh | 8.84 |
| Ft Monmouth | 9.73 |
| Niagara Falls | 9.46 |
| Philadelphia | 9.64 |
| Pittsburgh | 12.08 |
| Syracuse | 13.27 |

SE RRC

| DRC | PROP(%) |
|---|---|
| Atlanta | 18.34 |
| Beckley | 16.64 |
| Charlotte | 17.75 |
| Columbia | 23.32 |
| Jacksonville | 14.87 |
| Louisville | 14.09 |
| Miami | 12.02 |
| Montgomery | 14.17 |
| Nashville | 13.88 |
| Raleigh | 20.91 |
| Richmond | 15.08 |

SW RRC

| DRC | PROP(%) |
|---|---|
| Albuquerque | 16.02 |
| Dallas | 13.13 |
| Denver | 9.86 |
| Houston | 14.83 |
| Jackson | 20.11 |
| Kansas City | 10.00 |
| Little Rock | 16.96 |
| New Orleans | 15.13 |
| Oklahoma City | 13.96 |
| San Antonio | 15.44 |

MW RRC

| DRC | PROP(%) |
|---|---|
| Chicago | 7.38 |
| Cincinnati | 12.31 |
| Cleveland | 8.07 |
| Columbus | 14.10 |
| Des Moines | 11.08 |
| Detroit | 7.88 |
| Indianapolis | 10.83 |
| Lansing | 12.40 |
| Milwaukee | 9.41 |
| Minneapolis | 8.46 |
| Omaha | 13.02 |
| Peoria | 10.43 |
| St Louis | 13.55 |

W RRC

| DRC | PROP(%) |
|---|---|
| San Francisco | 6.36 |
| Honolulu | .00 |
| Los Angeles | 10.77 |
| Phoenix | 11.04 |
| Portland | 6.20 |
| Sacramento | 9.98 |
| Salt Lake City | 7.85 |
| Santa Ana | 9.39 |
| Seattle | 7.75 |

| REGION MEAN | PROP(%) |
|---|---|
| Northeast | 10.61 |
| Southeast | 16.34 |
| Southwest | 14.47 |
| Midwest | 10.30 |
| Western | 8.79 |
| NATIONAL MEAN (%) | 11.93 |

NOTE: Hawaii and San Juan are not included in the YATS Survey.
*RRC-Region Recruiting Command

ADI format, the other variables were collected in the same format. A decision was made to use a subset of the 214 ADI available, specifically, the 27 ADI representing the test market for the Army's Ultra-Veterans Educational Assistance Program (VEAP). These ADI comprised approximately 21 percent of the US population and had been selected by Rand Corporation for the Ultra-VEAP test because of their homogeneity in key economic and recruiting variables. Additionally, the ADI represented all regions of the country, displayed no systematic variation in the data, and varied from excellent to poor areas of recruiting success for the Army. Note that the educational test had not yet begun during the time frame of our data, therefore, the recruiting results of these ADI were not biased by this test. The time frame of the data was FY 79 and FY 80.

d. Discussion of Initial Regression Results

The initial regression results were intuitive. Shown below are the variables which were significant factors in predicting prime market accessions.

Table 4. Coefficient values for the prime market.

| VARIABLE | COEFF | F STATISTIC |
|---|---|---|
| RCTRS | .48 | 28.4 |
| ADV | .42 | 29.1 |
| PROP | .40 | 4.3 |
| CONST | .5353 | |

$R^2 = .91$

Compare these with the variables shown to be significant in predicting lower quality HSG accessions. (Table 5)

Table 5. Coefficient Values for the lower quality market.

| VARIABLE | COEFF | F STATISTIC |
|---|---|---|
| RCTRS | .18 | 5.3 |
| ADV | .78 | 135.8 |
| WAGES | 1.05 | 14.4 |
| UNEMP | .38 | 7.9 |
| PROP | 1.88 | 109.6 |
| CONST | 1.75 | |

$R^2 = .96$

The results clearly show that the prime market is influenced strongly by recruiter contact and advertising exposure. This group is not influenced, however,

by unemployment and wage variation. Our measure of propensity proved to be a factor in predicting success for this group and may capture any unemployment and wage effect. Clearly, DRC with a higher propensity will have better results in recruiting quality soldiers but recruiters and advertising dollars produce the dominant effect.

Contrast these results against the lower quality HSG recruit. Here we see propensity and advertising as the dominant factors while recruiters appear to be marginally significant. This group is also influenced by the local wage and employment opportunities. Notice, also, the difference between the two groups in the coefficient values for the Rctrs, Adv and Prop variables. Remember, the coefficients represent the variable elasticities. These differences highlight a major dilemma in the recruitment of the prime market. That is, if to attract the prime market, the Army advertises heavily and uses high recruiter densities in areas with high Army propensities (the Southeastern and Southwestern Recruiting Regions), the lower quality market is most affected by these resource allocations. Therefore, the resource allocation designed to increase the number of prime market recruits would, without proper management controls, flood recruiting stations with lower quality recruits. The major policy lesson to be learned here is that the effort to enlist more prime market recruits cannot be influenced by solely reallocating resources. Such an action would probably have a deliterious effect on recruiting quality soldiers. Instead, reallocation must be accompanied by major changes in sales force quota management.

e. Discussion of Final Regression Results

As stated earlier in the paper, the parameter estimates were obtained by an OLS solution to a logarithmic transformation of the multiplicative model

$$Y = e^{a0} X_1^{a1} X_2^{a2} \ldots X_n^{an} \qquad (5)$$

Unfortunately, the OLS solution to equation 5 produces poor parameter estimates since the solution to the log-linear model is not the solution to the multiplicative model. (See reference 1 for a detailed discussion of this problem.) To produce a solution to the multiplicative model, USAREC used an iterative, non-linear, Gauss Marquardt, least squares algorithm written at the Computing Technology Center, Union Carbide Corp., Nuclear Division, Oak Ridge, Tennessee and modified by North Carolina State University.

The Gauss-Marquardt (GM) solution and the log-linear solution are shown in table 6.

Table 6. Comparison GM and Cobb-Douglas solutions to prime market predictor variables.

| VARIABLE | G-M COEFF | G-M STANDARD ERROR | LOG-LINEAR COEFF |
|---|---|---|---|
| Recr | .59 | .0276 | .48 |
| Adv | .20 | .0205 | .42 |
| Prop | .42 | .0624 | .40 |
| Const | 1.306 | | .5353 |
| $R^2$ | .999 | | .91 |

Notice that the effect of advertising has diminished while the effect of recruiters' has increased. The effect of propensity remained almost constant. These results indicate that recruiter contact has the strongest positive effect on the prime market. The G-M parameter values were used in the optimization procedure described in the next section.

## IV. Optimization Results

The optimization problem is stated mathematically as

$$\min \sum_{i=1}^{57} c\, R_i \qquad (6)$$

$$\text{s.t.} \sum_{i=1}^{57} e^{a_0} \cdot R_i^{a_2} \cdot A_i^{a_3} \cdot P_i^{a_4} = T_s \qquad (7)$$

where $R_i$ = the number on-production recruiters in $DRC_i$.

$A_i$ = the media advertising dollars in $DRC_i$.

$P_i$ = the Army propensity in $DRC_i$.

$T_s$ = the national prime market accession requirements.

$c$ = the annual cost of maintaining a recruiter in a DRC.

The current USAREC recruiter distribution is shown in figure 1. Using the projected FY 82 on-production recruiter strength of 4839 and a projected FY 82 media advertising budget of $32,317,000 (FY 80 $), USAREC's projected prime market accessions are 27,785.

Furthermore, ORAM shows that to achieve the FY 82 goal of 39,100 prime market accessions under the current distribution scheme, 8328 recruiters

would be required (holding advertising dollars and distribution fixed). Conversely, holding recruiters fixed at current levels, $165,618,000 in national media expenditures would be required to achieve the 39,100 prime market accessions. After four sequential iterations of optimally distributing recruiters and advertising dollars, the optimal distribution of recruiters was derived (Figure 2). At the same FY 82 resource levels, USAREC's projected prime market accessions are 29,682, an increase of 1897 prime market accessions (6.82 percent increase).

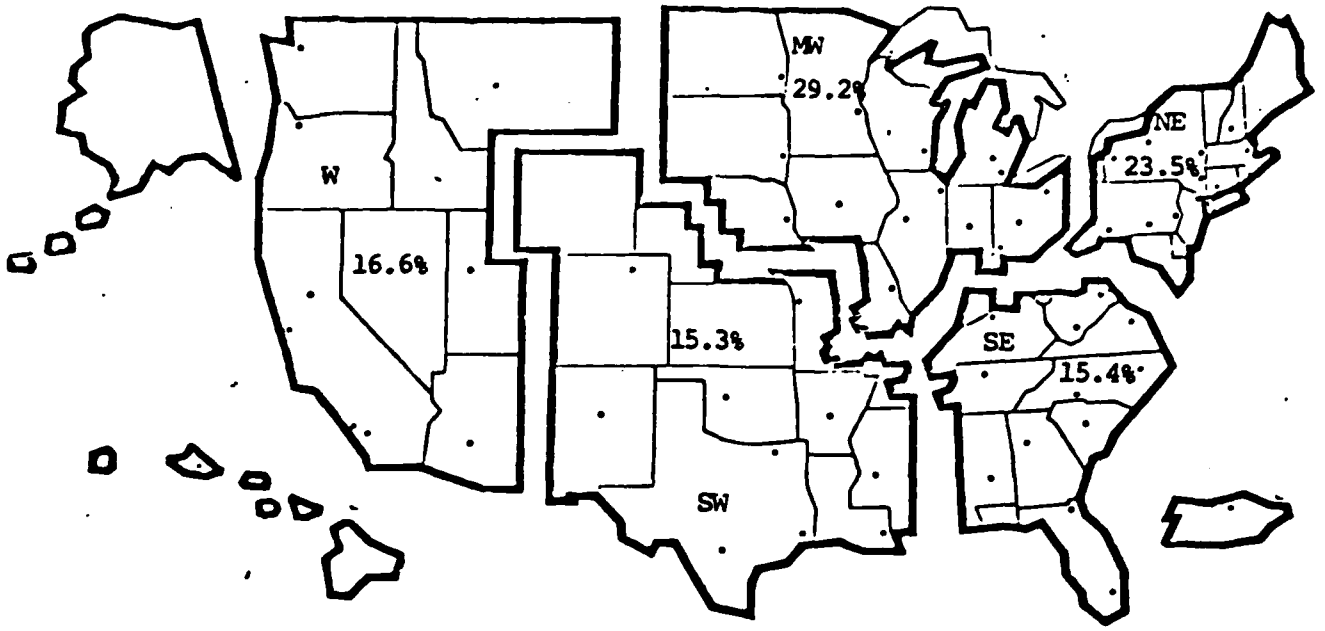
The optimal solution highlights a USAREC dilemma. That is, although USAREC is far from having an optimal distribution of its resources, an optimal solution produces only marginal improvements. Therefore, the reconfiguring of our recruiter organization would probably not be cost effective. Also, to achieve the FY 82 prime market goal using the optimal distribution of recruiters and advertising dollars would require 7716 recruiters (advertising fixed) or $128,160,000 in national media (recruiters fixed). These resource levels are certainly unrealistic expectations from a budget-minded President and Congress. However, the model does highlight that the SE and SW recruiting regions have far more potential for increasing their prime market accessions than the other regions of the country. This result is due, of course, to the higher Army propensities in these regions. Conversely, the Western Recruiting Region appears to be over-resourced and offers little potential for the expansion of the prime market.

As stated earlier, ORAM produces solutions for other accession requirements as well. For instance, if USAREC desired to place 20 percent of the FY 82 prime market accession requirement (39,100) into the combat arms (Armor, Artillery, Infantry), the optimal solution to achieve this goal would be as shown in figure 3. This solution places even more of the recruiters into the SE and SW regions, indicating that a greater percentage of the enlistments in these regions go into the combat arms. The ORAM solution also indicates that the goal of 20 percent prime market, combat arms accessions could be achieved with 5296 on-production recruiters with the total prime market accessions totaling 30,276. Similar solutions can be produced allowing USAREC to optimize the number of prime market, three and four year term of service accessions. In each case, the mathematical formulation of the problem is slightly altered.

## V. Conclusions

ORAM results indicate that attempting to increase prime market accessions through recruiter or advertising resources would be extremely costly. Therefore, USAREC must find other methods to increase prime market accessions. ORAM also demonstrated that, although USAREC's recruiting force is not optimally distributed, the current distribution represents a fair solution. ORAM demonstrates clearly that the SE and SW recruiting regions show the most potential for increasing prime market accessions. The model provides a method for justifying resource levels to Congress and a method of comparing

advertising and recruiter costs to the costs of other incentive programs such as combat arms bonuses and educational assistance. It can also show the number of accessions these incentive programs must draw for the Army to make its prime market accession goal. In FY 82 this market shortfall is predicted to be approximately 11,300. Finally, the model is a starting point for adding variables that can capture the effect of current and future bonus/educational programs. Once USAREC has determined the expected increase of prime market accessions due to these programs, the appropriate level of bonus/educational program funding can be adjusted to allow the Army to attain or exceed its prime market goals.




NE=Northeast Recruiting Region
SE=Southeast Recruiting Region
SW=Southwest Recruiting Region
MW=Midwest Recruiting Region
W=Western Recruiting Region

Figure 1. Current USAREC Recruiter Distribution.

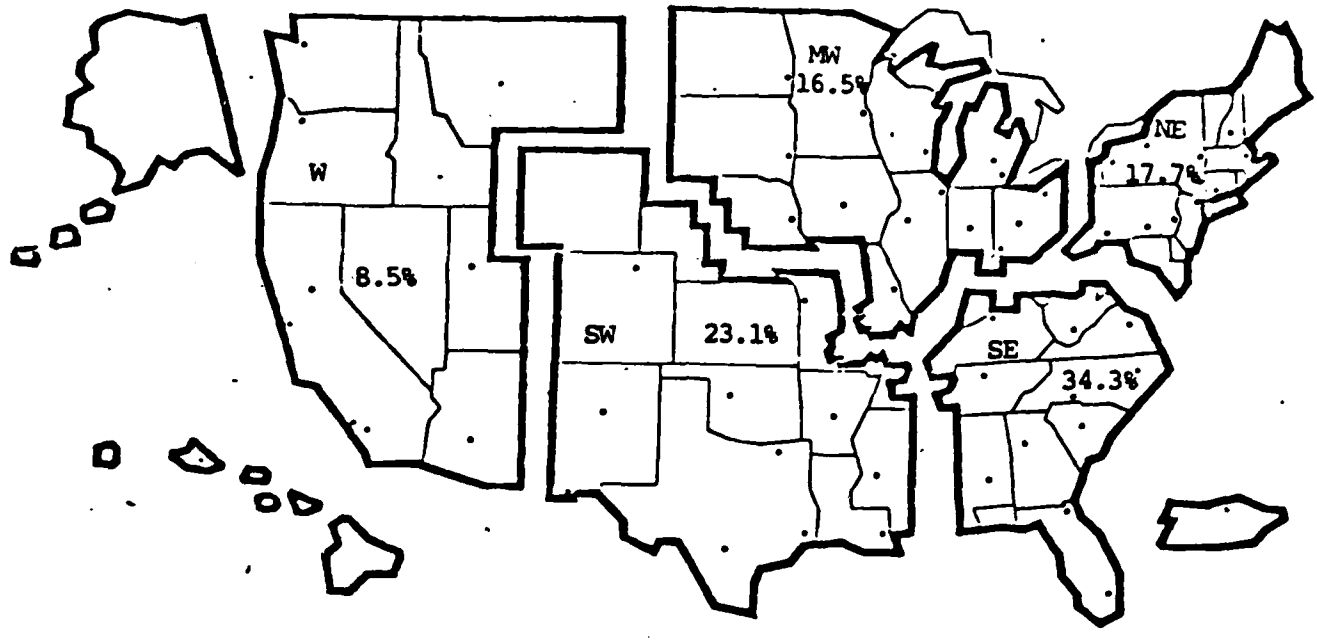



Figure 2. Optimal Distribution of USAREC Recruiters.

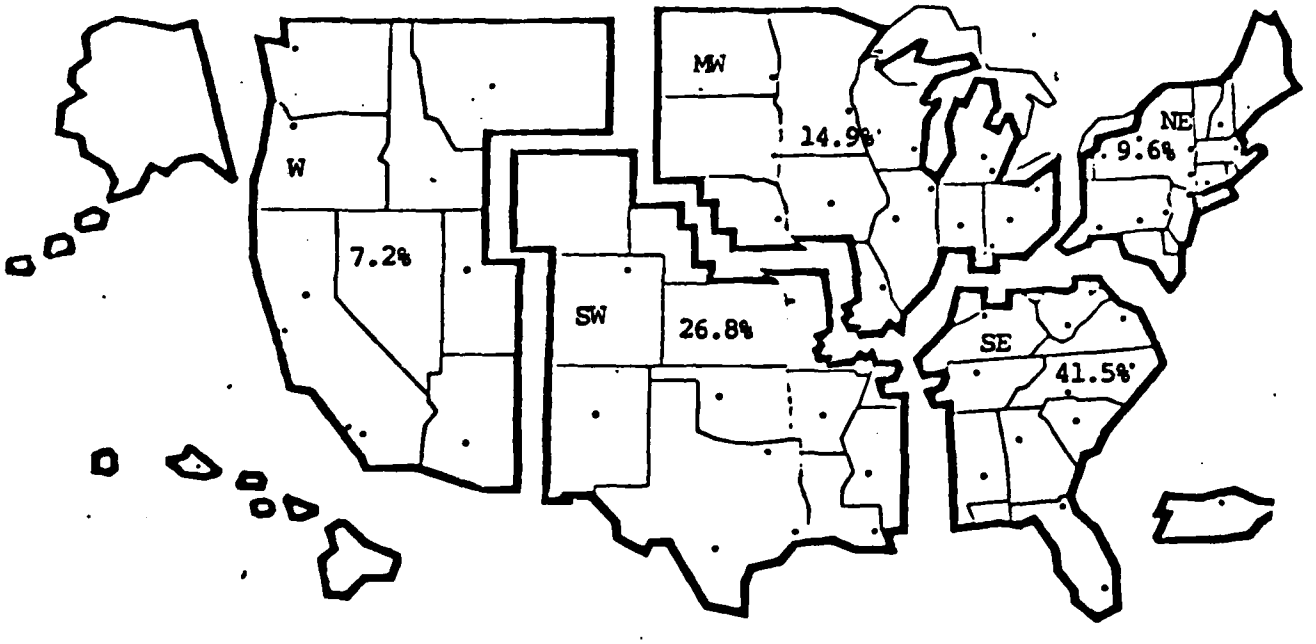



Figure 3. Optimal Recruiter Distribution required to place 20% of the FY 82 prime market accessions into the combat arms.

## References


1. Dotson, W. G., "Linearization Transformations for Least Squares Problems", Mathematics Magazine, May-June 1966, pp 178-183.

2. Huck, Daniel F., Documentation Report to Support the Analysis for Management of Recruiting Resources and Operations (AMRRO) System, Report No. CR-189 (General Research Corporation, McLean, VA, June 1977).

3. Huck, Daniel F., and Allen, Jerry, Sustaining Volunteer Enlistments in the Decade Ahead, Report No. CR-242 (General Research Corporation, McLean, VA, September 1979).

4. Souder, Paul S., Analysis for Management of Recruiting Resources and Operations, Report No. OAD-CR-166 (General Research Corporation, McLean, VA, November 1976).

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This paper summarizes USAREC's application of a non-linear model which distributes USAREC's production recruiting force for maximum enlistment of high-quality high school degree graduates. USAREC's recent improvements include the use of Gauss-Marquardt regressions, an advertising variable and an accurate measure of district attitudes toward military service.

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